Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

LOCATION: SWANSEA | **LLEOLIAD: ABERTAWE**

LEVEL 3 | **LEFEL 3**

MAY 2022

MODULE CODE: ACHA3000
INTRODUCTION TO MATHEMATICS AND SCIENCE (TEST 1 RESIT)

TIME: 1 ½ HOURS

(PLUS HALF AN HOUR TO SUBMIT SOLUTIONS – 2 HOURS IN TOTAL)

ANSWER ALL QUESTIONS

Equipment or materials required –

Calculators allowed

Formula booklet provided

SHOW ALL WORKINGS

IMPORTANT INSTRUCTIONS FOR ONLINE EXAMINATIONS:

- ***You will need to submit a digital photograph or scan of each page of workings***
- ***Please submit these to Moodle (underneath where you accessed the exam paper)***
- ***Put the time, date, module code and your student number at the top of each page***
- ***Number each page 'x of y'***
- ***If you have any issues, email richard.sutton@uwtsd.ac.uk***

1. Express the following as x to a power:

(i) $x^4 \times x^3 \times x^5 \times x$

(ii) $(3x^2)^2 \times 2x^4$

(iii) $\frac{x^5 \times x^2 \times x}{x^4}$

(iv) $\sqrt{x} \times \sqrt{x}$

(6 marks)

2. Solve the following linear equations for x:

(i) $4x - 5 = 7x + 1$

(ii) $5(2x + 1) = 12(3x - 2)$

(iii) $\frac{5}{(x+1)} = \frac{2}{(x-1)}$

(9 marks)

3. Solve the following quadratic equations **by using the factorisation method**:

(i) $x^2 + 7x + 10 = 0$

(ii) $x^2 - 6x + 8 = 0$

(iii) $x^2 + 11x + 10 = 0$

(iv) $x^2 - 64 = 0$

(12 marks)

4. Use the quadratic formula $\boldsymbol{x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}}$ to find the roots to the following quadratic equation:

$$10x^2 + 2x - 11 = 0$$

(5 marks)

5. Solve the following simultaneous equations:

$$2x + 3y = 11$$
$$4x + 2y = 18$$

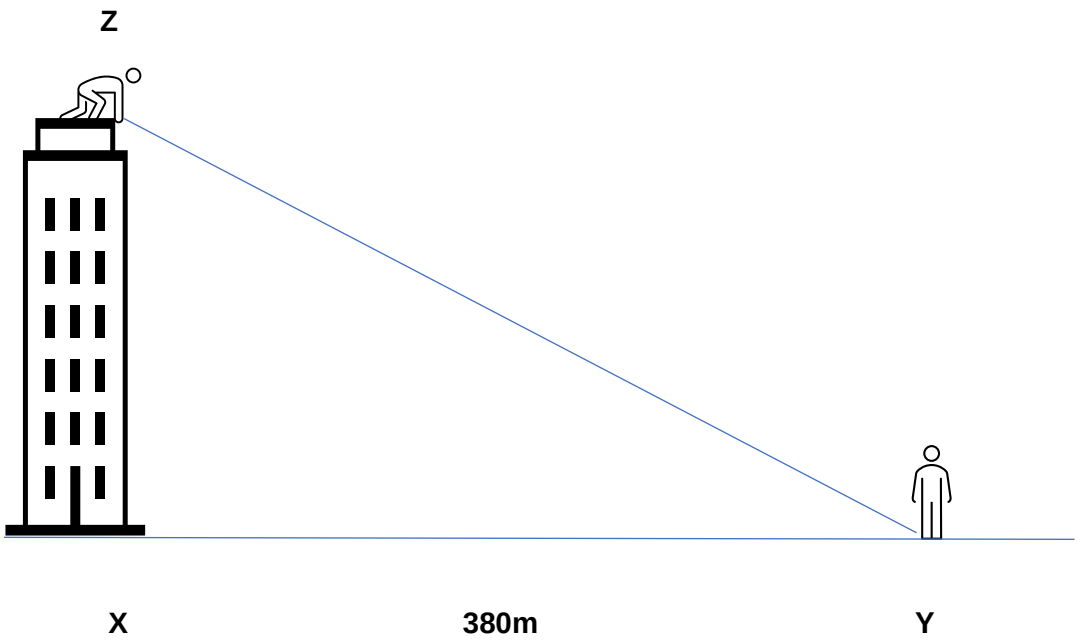
(5 marks)

6. Factorise the following expression **fully**:

(i) $10x^2y + 5x^2y^2$

(3 marks)

7. A person stands at the top of a building (at point Z) and drops a cable of length 400m to another person who is standing at the bottom of the building. The second person then walks away from the building holding the cable, along a horizontal surface, until the cable is taut (i.e. is firm and straight under tension). The end of the cable is then attached to the ground at point Y. The distance between the building and the person on the ground is 380m.



Assuming that the building is perpendicular with the ground, find the following:

(i) The height of the building
(ii) The angle created by the cable from the ground at point Y.

(6 marks)

TOTAL MARKS: 46